UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,781	01/30/2002	Sunao Kakizaki	520.41122X00	4152

20457 7590 04/20/2007

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER	
KIM, DAVID S	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/058,781	KAKIZAKI ET AL.	
	Examiner	Art Unit	
	David S. Kim	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5,6,13-15 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5,6,13-15 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Applicant's compliance with the objection to **claim 13** in the previous Office Action (mailed on 01 November 2006) is noted and appreciated. Applicant response included an amendment to claim 13. Applicant's response overcomes the previous objection, which is presently withdrawn.

Allowable Subject Matter

2. The indicated allowability of **claims 5-6, 13-15, and 17** is withdrawn in view of the newly discovered reference(s) to Fant et al. (U.S. Patent No. 6,950,215 B2, hereinafter "Fant"), Ishikawa (U.S. Patent No. 5,859,936), and Fatehi et al. (U.S. Patent No. 6,317,255 B1, hereinafter "Fatehi"). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Fant et al. as primary reference

4. **Claims 5-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fant in view of Ishikawa and Fatehi.

Regarding claim 5, Fant discloses:

An optical switching system configured by multi-stage connecting a plurality of optical switching devices (e.g., Figs. 4, 6, and 7), wherein the optical switching device comprises

a plurality of monitors with a monitoring function (e.g., 424, 426, 430, 434 in Fig. 4), the monitors detecting light on a path transmitting an optical signal input to the optical switching device (e.g., col. 6, l. 45-62), and wherein the monitors comprise

an optical branching circuit that separates the light of the optical signal (e.g., coupler for each of 424, 426, 430, 434 in Fig. 4); and

an optical detector that monitors the light (e.g., 424, 426, 430, 434 in Fig. 4).

Fant does not expressly disclose:

wherein the optical switching device comprises a plurality of ***optical reflection*** monitors with an ***optical reflection*** monitoring function, the optical reflection monitors detecting ***reflected light*** on a path transmitting an optical signal input to the optical switching device, and ***locating positions of reflection*** on the path, and wherein the optical reflection monitors comprise an ***optical isolator*** that passes only the optical signal and blocks the reflected light; an optical branching circuit that separates the ***reflected light*** of the optical signal; and an optical detector that monitors the ***reflected light***.

Rather, Fant discloses monitoring through tapping off forward propagating light. However, it is known in the art to provide monitoring through tapping off reflected light to locate positions of reflection, as shown in Ishikawa (e.g., monitoring of reflected light in Fig. 7). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to provide the function of monitoring ***reflected light***, as shown by Ishikawa. One of ordinary skill in the art would have been motivated to do this since Fant and Ishikawa are both concerned about troubleshooting optical apparatuses with fiber optic paths (Fant, e.g., col. 7, l. 35-42, 50-65, col. 8, l. 5-14, 66 – col. 9, l. 3; Ishikawa, col. 6, l. 62 – col. 7, l. 25). Monitoring reflected light is an obvious variation for detecting problems with fiber optic paths (Ishikawa, col. 1, l. 31-35), so monitoring reflected light in the apparatus of Fant would be an obvious variation.

Additionally, the use of an optical isolator and an optical branching circuit that separates reflected light in an optical reflection monitor is known in the art, as shown by Fatehi (425 and 420 in Figs. 3-4). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ these components in the optical reflection monitor of Fant in view of Ishikawa. One of ordinary skill in the art would have been motivated to do this to protect against undesirable backscattering or back reflection of optical signals which may cause damage to upstream components (e.g., lasers) or which may adversely affect the operation of upstream components (Fatehi, col. 4, l. 11-17).

Regarding claim 6, claim 6 is an apparatus claim that corresponds largely to the apparatus claim 5. Therefore, the recited means in apparatus claim 5 read on the corresponding means in apparatus claim 6. Claim 6 also includes limitations absent from claim 5. These limitations are:

wherein the optical reflection monitors comprise

an ***optical circulator*** that allows the passage of the optical signal and circulates or blocks the reflected light of the optical signal, and

an optical detector that monitors the reflected light.

However, Fant in view of Ishikawa and Fatehi teaches the variation of using an optical circulator in an optical reflection monitor (Fatehi, 220 in Figs. 2-3). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ such an optical circulator in the apparatus of Fant in view of Ishikawa and Fatehi. One of ordinary skill in the art would have been motivated to do this since an optical circulator also provides protection against undesirable backscattering or back reflection of optical signals which may cause damage to upstream components (e.g., lasers) or which may adversely affect the operation of upstream components (Fatehi, col. 4, l. 11-17, col. 6, l. 12-19).

5. **Claims 13-15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fant in view of Ishikawa, as combined in the treatment of the claims above.

Regarding claim 13, Fant in view of Ishikawa discloses:

An optical switching method enabling detection of reflected light, the method comprising the steps of:

making a setting for switching an optical switch and storing optical interconnection relationships (Fant, e.g., "settings" and "setting" in col. 7, l. 26 – col. 8, l. 14 implies knowing the optical interconnection relationships of the switches in Fig. 4 for finding locations of "malfunctioning");

making a selection (Fant, selection implied by control of switches in Fig. 4 by controller 504 in Fig. 5;) of a circuit board on which optical switching devices are mounted according to a command from an operation control unit (Fant, controller 504 in Fig. 5) and storing all optical reflection alarm information (Ishikawa, alarm information in col. 6, l. 62 – col. 7, l. 25); and

locating positions of reflection (Ishikawa, col. 7, l. 5-25) according to the optical interconnection relationships (Fant, e.g., "settings" and "setting" in col. 7, l. 26 – col. 8, l. 14 implies knowing the optical interconnection relationships of the switches in Fig. 4 for finding locations of "malfunctioning") and the

optical reflection alarm information being stored (Ishikawa, e.g., status signals in Fig. 7, information sent to alarm devices in col. 7, l. 1, 19),

wherein the step of storing the optical reflection alarm information includes steps of:

transferring the optical reflection alarm information from the optical switching device to the operation control unit (Ishikawa, transfer of status information to supervisory equipment in Fig. 7, such as the controller 504 in Fig. 5 of Fant);

updating the contents of the optical reflection alarm information being stored based on the optical reflection alarm information by the CPU (Ishikawa, implied by the collection of status signals for transmission to supervisory equipment, col. 7, l. 9-19).

Fant in view of Ishikawa does not expressly disclose:

wherein the step of storing the optical reflection alarm information includes steps of:

transferring the optical reflection alarm information from the optical switching device to the operation control unit ***after transmitting an optical reflection alarm acquisition request to the optical switching device mounted on the selected circuit board by a CPU.***

However, requesting information from monitoring devices is a standard practice in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to transfer the optical alarm information from the optical switching device to the operation control unit *after transmitting an optical reflection alarm acquisition request to the optical switching device mounted on the selected circuit board by a CPU.* One of ordinary skill in the art would have been motivated to do this to initiate the testing of the apparatus (Fant, e.g., col. 4, l. 30-32) so that the apparatus knows when to collect the alarm information (Ishikawa, col. 7, l. 9-19).

Regarding claim 14, claim 14 is a method claim that corresponds largely to the method claim 13. Therefore, the recited means in method claim 13 read on the corresponding means in method claim 14. Claim 14 also includes limitations absent from claim 13. These limitations are obvious under Fant in view of Ishikawa:

wherein the step of locating the positions of reflection includes steps of:

detecting an alarm position according to the optical reflection alarm information that has been stored (Ishikawa, location of the fault in col. 7, l. 5-25), when optical alarm information is present (Ishikawa, presence of the status signals in col. 7, l. 5-25);

searching the optical interconnection relationships being stored (Fant, e.g., "settings" and "setting" in col. 7, l. 26 – col. 8, l. 14 implies knowing the optical interconnection relationships of the switches in Fig. 4 for finding locations of "malfunctioning", and one would search through the optical interconnection relationships to locate the instances of "malfunctioning");

selecting a suspected abnormal optical interconnection path (Fant, e.g., "settings" and "setting" in col. 7, l. 26 – col. 8, l. 14 includes the selection of the various paths through the switch, including the path of the suspected abnormal optical interconnection path); and

after determining a rearmost connection among interconnected points at which reflected light occurs, notifying the operation control unit of the rearmost connection (Ishikawa, Fig. 7, one would not expected reflected light to be detected after the reflection location since the reflection would indicate no further propagation of light, so notification of the reflection location would be equivalent to notification of the rearmost connection).

Regarding claim 15, Fant in view of Ishikawa discloses:

A method of collecting optical reflection alarm information in an optical switching system including a system control unit (Fant, e.g., controller 504 in Fig. 5) and a plurality of optical switch boards (Fant, switches in Fig. 4) each of which is provided with a board control unit (Fant, not shown but standard to include with each switch in Fig. 4) and a plurality of optical reflection monitors coupled to I/O ports of an optical switching unit (Ishikawa, monitoring of reflected light in Fig. 7), the method comprising the steps of:

performing a settings for optical path switching in each of said optical switching units and storing information indicative of optical interconnection relationships between the I/O ports into a switching information register (Fant, e.g., "settings" and "setting" in col. 7, l. 26 – col. 8, l. 14 implies knowing the optical interconnection relationships of the switches in Fig. 4 for finding locations of "malfunctioning");

determining status of an optical signal path passing through an I/O port coupled to a optical reflection monitor (Ishikawa, status signals in col. 7, l. 5-25) by comparing a monitored signal received from the selected optical reflection monitor with a predetermined threshold (Ishikawa, e.g., reference level in S11 in Fig. 4);

setting status information indicative of the status of said optical signal path into an optical reflection monitoring register (Ishikawa, port status acquisition unit in Fig. 7); and collecting said status information from each of optical switch boards by said system control unit (Ishikawa, collection of status signals for transmission to supervisory equipment, col. 7, l. 9-19).

Fant in view of Ishikawa does not expressly disclose:

performing a settings for optical path switching in each of said optical switching units and storing information indicative of optical interconnection relationships between the I/O ports into a switching information register ***by each of said switching board control units in accordance with instructions from said system control unit***;

selecting one of said optical reflection monitors one after another by each of said board control units;

determining status of an optical signal path passing through an I/O port coupled to said selected optical reflection monitor by comparing a monitored signal received from the selected optical reflection monitor with a predetermined threshold ***by said board control unit***;

setting status information indicative of the status of said optical signal path into an optical reflection monitoring register ***by said board control unit***; and collecting said status information ***from each of optical switch boards*** by said system control unit.

However, the location of various control functionality is an obvious limitation to vary. That is, Fant discloses controller 504 in Fig. 5. However, it is also standard to include board control units for each switch in Fig. 4 to process the control signals from controller 504 in Fig. 5. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to arrange the board control units to perform the control functionality highlighted above. One of ordinary skill in the art would have been

motivated to do this to provide localized control for each switch, which is generally faster than a single, centralized control for all of the switches.

Moreover, "selecting one of said optical reflection monitors one after another" is just one of a number of obvious ways to poll the monitors for the monitoring information. One could also obviously select a group of the monitors at a time. One could also obviously select all of the monitors. One could also obviously select only some and not others. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to "selecting one of said optical reflection monitors one after another". One of ordinary skill in the art would have been motivated to do this to poll all of the monitors for monitoring information to provide status information for each monitoring location to provide comprehensive status analysis of the apparatus.

Regarding claim 17, Fant in view of Ishikawa discloses:

The method according to claim 15,

wherein the status of said optical signal path is determined by comparing a monitored signal value with said threshold by said board control unit (Ishikawa, e.g., comparison in S11 of Fig. 4), and

said status information includes a "1" bit to indicate an abnormal condition when the monitored signal value was judged smaller than the threshold and a "0" bit to indicate a normal condition when the monitored signal value was judged not smaller than the threshold (Ishikawa, col. 7, l. 12-16).

Fant in view of Ishikawa does not expressly disclose:

wherein the status of said optical signal path is determined by comparing ***an A/D converted*** monitored signal value with said threshold by said board control unit, and

However, A/D conversion is standard practice in the art for processing an analog optical signal, such as the reflected light in Fig. 7 of Ishikawa. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to perform such A/D conversion. One of ordinary skill in the art would have been motivated to do this since one would expect the electrical circuitry of Fig. 7 of Ishikawa to mainly operate with digital electrical signals. That is, the electrical circuitry of Fig. 7 of Ishikawa

implement various control functionality that is easier to perform with modern digital technology than with analog technology, which is generally associated with much older and bulkier circuitry.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSK

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER